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HOME LAUNDERING

METHODS, EQUIPMENT, SUPPLIES, and COSTS

Lucille J. Williamson

Preface

This bulletin is written to suggest ways in which you can do a satisfactory laundry at reasonable cost and with as little work as possible. We have included information about ways of washing, and about supplies and equipment offered you in the market.

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HOME LAUNDERING is an art. Like any art, it requires patience and practice to learn the right techniques. Not one, but many combinations of methods and equipment make for success. Two homemakers may use different water, different equipment, and different soaps; yet they both can have clothes that are beautifully clean. On the other hand, Mrs. Jones will place on the line a sparkling white wash for which she has had a small supply of water and a decrepit washing machine. Mrs. Adams, who has plenty of hot water, an excellent machine, and a good soap and water softener, will hang out a dingy, grimy wash. What makes the difference?

The greatest difference is that Mrs. Jones followed a good method of work and Mrs. Adams made mistakes such as failing to soften the water for rinsing, using too little or too much soap, or using wash and rinse water that had become dirty.

In any successful laundry method, you must first sort the clothes carefully. If more than one load is to be washed in the same water, the least soiled items should be done first and the water replaced when it becomes dirty. Materials with dyes that run, those that lint badly, and those with stains or badly soiled spots should be handled so that they become clean without soiling other garments.

You should understand something of the soaps and other detergents sold for laundering. The basic ingredient of each is soap or a detergent that behaves much as soap does except that it does not curd in hard water. Many of them have other substances added to solve special laundry problems. Those for general laundry work are made more alkaline and have water softeners added. Many of them contain something that will make clothes appear whiter and brighter. Some of the synthetic detergents are put together in such a way that there is less sudsing than when most soaps and synthetic detergents are used. These are made for tumbler washers where a large amount of suds reduces effective action.

The detergents can be grouped as:

Product	Use
Soap	For all kinds of washing in which suds do not interfere and in which softeners are used if the water is hard
Synthetic detergents	For any washing, especially for hard water when a softener is not used
Mild soap and synthetic detergents	For washing delicate materials that might be damaged by stronger alkali wash water and for materials that are only slightly soiled
General purpose soap and synthetic detergents	For heavier soil and the general family wash
Controlled sudsing detergents	These can be used for all kinds of washing. They are made especially for tumbler-type washing machines. A high suds reduces the washing action

Points to Remember When Washing

1. Sort laundry

Materials requiring the same water temperature can be washed together

Lightly soiled fabrics can be washed first if the water is used for more than one load

Colors that may run can be washed alone

2. Shake out any dirt that can be removed easily

Dust, sand, and many other soils will settle on lightly soiled clothes and make them appear dirtier. You will have fewer laundry problems if such soil is removed before washing.

3. Rinse out in cool water any soil that will be set by hot water

Water that is hot enough to do a good job with white linens and cottons will set some stains from foods and other products into the fabric so that it is difficult or impossible to remove them. Egg, milk, blood, and meat are the usual soils in this group.

4. Rinse out in clear water soil that will form soap curd

Table linens, farm work clothes, and children's clothing worn at the table or when playing outdoors may well have picked up calcium com-

pounds, which cause much of the soap curd formed in hard water. Among rich sources of calcium are milk, custards, gravies and other foods made with milk, and granular materials used to settle dust and to keep snow- and ice-covered roads from being slippery.

5. Give special treatment to spots that are hard to remove

The detergent you use for washing can be rubbed into badly soiled spots. Dampen the spots first. Soiled collars, grease spots on aprons, and the grimy seats of small children's pants need special treatment such as scrubbing on a hand board or with a brush. Many stains must be treated with special preparations. Stains of unknown origin should be rinsed in cold water before they are given other treatment.

6. Use the right amount and kind of wash water

Each washing machine has its own water line which is marked on the inside of the machine or indicated in the book of directions. Usually a machine filled to the water line will hold from 14 to 18 gallons of water.

Water softeners, soap, and other detergents should be mixed with the water before clothing is added. When this is not possible, as with some automatic machines, manufacturer's directions for measuring and adding the soap or other detergent should be followed.

7. Use water of the right temperature

The clean white wash of scrubboard and boiler days was a result of boiling the clothes for some time. Nowadays, the washing machine, water softeners, and new detergents make it possible to wash clothes clean without boiling them. Even so, much home washing could be improved by raising water temperatures to nearer those used in commercial laundries. The American Institute of Laundering makes the following recommendations for washing temperatures:

White cottons and linens	160°F.
Light-colored cottons and linens	120°F.
Dark-colored clothes	90°F.
Rayons, nylons, and other synthetic fabrics	90°F.
Woolens	80°F.

It is recommended that all waters in which wools are washed and rinsed be the same temperature. A change to higher or lower water temperatures causes shrinkage.

Washing temperatures for white cottons and linens should be at least 130 to 140 degrees F. if possible. A higher temperature is often impractical because of the danger from scalding hot water as it comes from the faucet, and because of the corrosion that takes place in water systems

at high temperatures. When these higher temperatures are used, it is worth considering glass-lined or stainless steel tanks to avoid the corrosion that occurs when pipes and tank are of iron or galvanized iron.

Rinse water may be warm or cold. Warm water rinses more rapidly than cold. When a cold rinse is used, thorough agitation is essential and more water may be needed. A usual plan is to have a warm rinse followed by a cold one.

8. *Avoid overloading the machine*

Clothes should be able to move freely in the water; otherwise the machine labors under a strain and the clothes are poorly washed. Unnecessary wear and linting of fabrics occur when clothes are crowded in the wash water.

9. *Select soap and synthetic detergents with care*

Mild or unbuilt soaps and synthetic detergents are suitable for delicate materials such as wool and silk. Built soaps and synthetic detergents are more suited to general laundry. The built products may be needed for delicate materials that are badly soiled but great care must be used to prevent damage to these materials.

When soap is used in hard water, both wash and rinse water should be softened. The synthetic detergents do not form soap curd and are preferred by many because they do not require a water softener.

Synthetic detergents may also be preferred because of their ability to remove grease. Because some manufacturers feel that synthetic detergents are not adapted to their machines, you should check the choice of washing compounds with your salesman or with the home economics department of the company that makes your machine.

All soaps make solutions that are alkaline and this alkalinity is helpful in cleaning. Synthetic detergents do not give alkaline solutions unless builders have been added for this purpose. For this reason, mild synthetic products sold for fine washing are adapted to washing delicate materials and dyes that may be altered by the alkalinity of soap solutions. Without an alkaline solution, however, cleaning will not be satisfactory if articles are heavily soiled.

Controlled sudsing detergents have been made to meet the need of the tumbler washer in which the sudsing of soap or other detergents will hamper washing action unless the worker follows directions to keep suds below the proper line. There is little or no sudsing with these compounds.

10. Use the right amount of detergent

When soap or a sudsing detergent is used, suds should be maintained at all times. The label on the product will usually call for suds of an inch or two in the agitator machine. In the instruction book which comes with a tumbler machine, there are directions for keeping the suds level below the point at which it will interfere with washing action. It usually takes from one to one and a half cups of detergent for a load in the agitator machine and about half as much in the tumbler machine. More soap is needed when water is hard and more of any detergent when clothing is heavily soiled. If you wash more than one load in the same water, you will need to add a little more detergent with each extra load.

11. Understand how to use water softeners

New water softeners have been developed that leave softened water clear. They are called non-precipitating, to distinguish them from so-called precipitating softeners such as washing soda, borax, and trisodium phosphate, that leave the water cloudy. The new softeners dissolve soap curd and are less alkaline than precipitating ones. Larger amounts of the non-precipitating ones are needed to soften water and they are more expensive, but in spite of their greater cost they are one of the most popular washing supplies.

Directions for the amount of softener to use are given on labels and in books that come with washing machines. You can experiment to find how much softener you need to make suds when the soap is first added. If the water is still hard, curd will form and more soap will be required for sudsing.

12. Have a short washing period

The wash water carries cleansing agents over the surface and into the fabric to loosen soil and flush it away. Much of the soil is dissolved in the water, some sinks to the bottom of the tub or floats to the top, and some remains suspended in the water. Experiments have shown that the soil is released in a very few minutes and that the suspended soil resettles on the fabric. Slightly soiled articles are clean in two or three minutes; 10 or 15 minutes is considered adequate time for removing the heaviest soil. If the laundry is not clean by that time, a second washing in fresh water and detergent is suggested.

13. Rinse thoroughly

Plenty of clean rinse water and good agitation are necessary to remove soap, softener, and soil from fabrics. Rinse water should be replaced with fresh water as soon as it becomes soiled. Thorough wringing or spin-

ning will reduce the soil moved from one wash or rinse water to the next. Lengthening the spinning period and good adjustment of the wringer will help reduce the soil brought to the rinse water. The rinse in which clothes are submerged, sometimes called the deep rinse, and the spray rinse used with spinner machines are effective. Automatic machines usually use a combination of spray and deep rinses. Many of them have an overflow rinse so that loose soil is washed away and not strained through the clothes.

Each rinse adds to the cleanness of the wash. When water is limited, remember that more dirt will be flushed away by two or three small rinses than by the same amount of water used as one rinse.[1]

LAUNDRY SUPPLIES AND EQUIPMENT

Soaps and Other Detergents

In the laundry cupboard there is usually a built detergent for general washing, and a milder, unbuilt one for hand washing of delicate garments. The homemaker buys by brand name and is more concerned with what the detergent will do than with what it contains. She often does not know or care whether it contains soap or a synthetic washing agent. When you find a satisfactory product, you will have better results if you use it repeatedly and alone rather than changing it or mixing it with others that may reduce its cleaning action.

Although the basic ingredients of the branded laundry products are soap or synthetic products, these products are mixtures of many materials, each chosen to improve the cleaning action, to make it pleasant to use, or to protect the machine from corrosion. Water-softening agents and alkaline materials are included in most of the washing products. Many contain special ingredients that have come into use recently to solve special problems connected with synthetic detergents and automatic washing machines. Such ingredients may be given new names and advertised as new discoveries. One, an ingredient reflecting certain light waves, adds to the brightness of the wash. Another that is added to many synthetic detergents gives them a valuable characteristic of soap, which prevents soil in the water from settling back on the clean fabrics. It is called CMC, an abbreviation of carboxy methyl cellulose.

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[1]This can be shown by calculating the soap and dirt that remain when an eight-pound load of clothes is rinsed in ten gallons of water and when two five-gallon rinses are used. Almost a gallon of water, with the suspended soap and dirt, will remain in the clothes after wringing or spinning them. Thus one-fifth of the suspended and dissolved materials would remain after one five-gallon rinse and one-twenty-fifth (1/5 of 1/5) after the second five-gallon rinse. One-tenth of the suspended and dissolved materials (almost three times as much) will be left in the clothes after the ten-gallon rinse.

Bleaches

Chlorine bleaches are sold in liquid and powdered form. Wool, silk, and many of the new fabrics, however, are damaged by chlorine. It combines with finishes used to stiffen some fabrics, turns them yellow or orange, and gives them a strong chlorine odor. Materials that are pressed to give the appearance of piqué, or that have embossed designs or finishes for lasting stiffness, such as organdy, should be tested by dipping threads or clippings in the bleach to see how they react. There are milder powdered bleaches for situations in which chlorine bleaches cannot be used.

A major laundry problem is the overuse and abuse of bleaches. Water with a very little chlorine bleach will remove almost all stains. More chlorine will weaken fabrics and make them lint in the wash water. All too frequently, holes appear and fabric tears because too much bleach was used or because articles were placed in the water before the bleach was well mixed with the water.

When the label suggests that the product *not* be used for wools and silks, it indicates almost certainly a chlorine bleach. If the bleach is recommended for wool and silk, it is one of the milder bleaches, technically known as a perborate.

Bluing

Although it is often thought that bluing improves the whiteness of laundered articles, it simply counteracts the yellow that sometimes appears in white fabrics. Most bluings are solutions that mask the yellow and make the fabric appear a little more gray. Some of these are the same fluorescent dyes that are being mixed with many detergents. They reflect ultraviolet light waves so that the white articles appear brilliant and colors bright when seen in a light that has a good proportion of ultraviolet waves. The effect is less apparent indoors than outdoors because the light that comes through the windows has many ultraviolet waves removed. Certainly the appearance of the wash on the line is improved by the fluorescent dyes.

Stiffening agents

Starch is by far the most frequently used stiffening agent. There is on the market at least one pre-cooked starch that can be mixed with water and used without cooking. The bottled starches are ready for use when they are diluted and are especially convenient when there are only a few articles to be starched. Although the liquid starch costs more than the dry starch, it may be economical in the end because there is less waste.

Other products sold for stiffening contain waxes and resins. Statements on the label indicate that results are similar to, or better than, starch and are more lasting. Directions should be followed with care. If you encounter problems such as spotting or too much stiffness in your clothes, write to the manufacturer for help.

Washing Machines

Whether you wash clothes on a scrubboard or with an automatic or non-automatic machine, the washing is all done in the same way. Clothes are moved through hot water to which washing supplies have been added, and then the dirt and washing supplies are rinsed away. The automatic machine eliminates much of the unpleasant work of getting ready to wash, cleaning up afterwards, and handling the laundry. It relieves you of some decisions, such as when clean water is needed. On the other hand, it requires more water and supplies if three or four loads must be run separately. You may hesitate to run a complete cycle for a few pieces that could follow a larger load in the non-automatic machine. Since you do not handle the clothes, you cannot remove the spot that did not wash out and therefore needs some special treatment. As with all automatically controlled equipment, there may be more repair than for the ones that are operated by hand.

The worker who has used only the automatic machine may not realize the care and precautions that are necessary when a wringer is used. The wringer can swing out of line; clothes can be wrapped around it and buttons pulled off; hair, hands, and arms may be drawn into the wringer. Learn how to use the wringer safety release. Millions of wringer washers are giving satisfactory service, so learn how to protect the machine and those who are near it.

Everyone who uses a washing machine should read the manufacturer's directions and follow them carefully. These directions may include the brand names of detergents and water softeners that are recommended for the machine.

Clothes Dryers

Tumbler clothes dryers use the well-known aids of a good breeze and heat to speed drying and make the fabric soft and fluffy. Air is sucked or forced through a drum that tumbles the clothes, and heat is provided by a heating unit much like that in an oven. The heat unit, made for gas or for most electric dryers, is designed to dry an eight-pound load of clothes in an hour or less so the dryer can be ready for a second load when it comes from the washer. From six to eight pounds or pints of water will be removed in this time.

Some dryers require a heavy duty circuit; others can be plugged into the usual house circuit. Because this latter type of dryer produces only one-third as much heat as the heavier duty unit, the drying period is almost three times as long. Consequently, the cost of rapid and of slower drying is the same. The unit heats almost all the time that there is water to be dried away. The temperature is held down to that of hot wash water until the clothes are nearly dry. When the clothes are nearly dry, the temperature in the dryer rises rapidly because the cooling action of water evaporation no longer exists. At this point, unless the

dryer has a thermostat that can be set for a low temperature, you should remove materials that will be damaged by higher temperatures.

Avoid overdrying. It causes deep-set wrinkles that cannot be ironed out easily and produces a harshness of fabric that may be permanent. It is a good practice to remove clothes that are not to be ironed while there is still a trace of steam in the dryer. Others can be taken out while still damp enough to iron.

Irons and Ironing Equipment

Much equipment has been developed recently to improve the quality of pressing and ironing and to make the work easier. Adding a temperature control to irons made it possible to use a thousand-watt heating unit that speeded up heating so that heavy and damp fabrics could be ironed more rapidly. The steam iron has made it easier to press garments and to iron new fabrics. Ironing boards of adjustable heights, with the base support arranged so that you may sit or stand comfortably, have added to comfort. There are small portable ironers for those who like to iron with a machine and do not have a large amount of ironing or space for a larger ironer. There are large ironers for those who have the space and much ironing to do.

It is easier to choose ironing equipment than other laundry appliances. Irons and ironers operate economically on the usual household circuit and require no special installation and little repair. If you buy an ironer, however, you should realize that for complete satisfaction you must train yourself to use it as you learn to drive a car, by study and practice. The operation of the ironer is a highly skilled activity. Many women through experience learn to iron shirts, dresses, and other garments that seem too difficult at first. These women value the help this appliance gives them.

Special Problems of Laundering

Good equipment, good supplies, softened water, and good methods of work generally make for satisfactory laundry work. Under the best conditions, however, individual problems arise that require individual solutions. Stains that do not respond to bleaching require their own solvents. There are college bulletins, government bulletins, and sections in books that come with the washing machines which suggest remedies for the more common stains. General griminess is often helped by repeated washing in high concentrations of the nonprecipitating water softeners.

Special Water Problems

Minerals other than those that cause hard water make special laundry problems, many of which are not yet solved. Companies that sell zeolite water softeners for household water systems also can help with other water problems such as the presence of iron, copper, and sulphur in the system.

Iron compounds frequently give trouble in laundering. They are partially removed by the softeners. If iron in the water comes from the source of supply, a special filtering tank can be installed in the water line. If the iron comes from rusty pipes and tanks, they may have to be replaced. If it comes from water causing pipes to rust because it is slightly acid, as much naturally soft water is, the plumber can install a small device that contains a polyphosphate to correct the acid condition as the water flows through it.

The Costs of Home Laundry Work

Laundry costs are considerable whether the wash is done at home, at a commercial laundry, or at a self-service laundry. Before buying elaborate laundry appliances, it is wise to consider the cost of using commercial service. Once a large investment is made, the added costs of doing the work at home will be less than sending it out. But even after a large investment has been made, there will be times when other pressures such as limited time, heavy work loads, and ill health will make it worth while to use commercial services.

You may well prefer to do at home garments that need careful handling and considerable ironing because of cost and results. Most laundrymen will applaud your decision since this work is the kind that creates most of their problems and that is likely to cost the laundry more than customers are willing to pay. Bulky towels, sheets, and other flat work can usually be sent out at lower cost. The costs discussed in this bulletin are the ones that often vary and that may determine what equipment you will buy, how you will pay for it, what you will wash at home, and what method you will use.

Equipment Costs

Original equipment costs will include the price paid for the equipment and the installation charge. Cost may also include adding electric or gas lines, construction changes, financing the purchase, and buying equipment to provide an adequate supply of hot, soft water. A good used washing machine may be purchased for perhaps fifty to seventy-five dollars, or a thousand dollars may be paid for deluxe automatic washing machine, dryer, and ironer. Installation and other extra costs, however, sometimes run higher than the original cost of the equipment.

Credit Costs

Most appliances are purchased on an installment payment plan. The cost of this credit varies widely. For example, one family in studying credit plans that seemed practical for them found that the least expensive would add sixty dollars to their thousand dollar purchase and the most expensive would add three hundred dollars. The least expensive was a bank loan at six per cent that would

be repaid in a year. The most expensive was a loan that would be included in the house mortgage. This loan would be at an interest rate of five per cent, there would be added cost for such things as title search, and monthly payments would be made over a period of fifteen years. The family rejected the first plan because of the large monthly payments which they felt would leave them too little for other needs. The small monthly payments of the fifteen-year plan were tempting but this plan too was rejected because of the high cost of the loan. A plan more expensive than the bank loan and less expensive than the fifteen-year plan was selected. Monthly payments are high on short term loans, and credit costs are high on long term ones.

The Cost of Water

Water costs are not high for most of us. At 25 cents for 100 cubic feet of water, one cent buys 30 gallons, which will take care of one cycle of many automatic washing machines, or it will more than provide enough water for one load in dryers that use a water cooling system. Fourteen to 16 gallons of water are needed for non-automatic washers. Eleven gallons will fill to a depth of 7 inches a square rinse tub 20 inches on the side, or a round tub 22 inches in diameter.

The water requirements of 1953 models of automatic washing machines were reported by the manufacturers as follows:

	Range of 16 machines	About one-half of them used
Total amount of water	24 to 46 gallons	26 to 30 gallons
Amount that must be heated	11 to 25 gallons	14 to 18 gallons

Some of the machines used a higher proportion of hot water than did others. The cycle of one washer requires 25.5 gallons of hot water and 14.5 gallons of cold water, a total of 40 gallons. Another uses 14 gallons of hot water and 32 gallons of cold water, a total of 46 gallons.

The Cost of Hot Water

The cost of heat for water is the largest and most variable operating cost in most households. It often costs from ten to twenty times as much to heat a gallon of water as to buy it. For this reason, it is wise to examine fuel rates carefully, to see that a heating system is efficient, and to avoid waste from dripping hot water faucets, long runs of pipe, and frequent drawing of water for only a little hot water.

For practical estimates a good water heating system, efficiently used, will require about ¼ kilowatt hour of electric power, or 1½ cubic feet of natural gas, or ½ cubic foot of liquefied petroleum* to heat one gallon of water. At the rates stated below, the cost would be:

Electricity	To heat 10 gallons of water
2 cents a kilowatt hour	5 cents
1 cent a kilowatt hour	2½ cents
Natural gas	
20 cents for 100 cubic feet	3 cents
10 cents for 100 cubic feet	1½ cents
Liquefied petroleum*	
10 cents a pound	7 cents
5 cents a pound	3½ cents

*Popularly called bottled gas

The Cost of Heat for Drying

It will cost from two to twelve cents to dry most loads, depending on the kind of material, the amount of water left by the washing machine, the weight of the load, and the rates paid for gas or electricity. Gas dryers and electric ones that are built for heavy duty circuits will dry most full loads within an hour and have them dry enough for ironing in half that time. Electric dryers that can be connected to the usual house circuit will require two or three times as long because a much smaller heat unit must be used. The heat required to dry away the same amount of water will be approximately the same with all dryers.

Three or four kilowatt hours of electricity will be used to dry a load on the average and customers will pay from one to three cents a kilowatt hour for it.

It will take from 15 to 20 cubic feet of natural gas to heat a gas dryer for an hour. The customer in New York State is likely to pay from ten to twenty cents for 100 cubic feet of natural gas.

Each dryer states on the name plate the hourly demand for gas or electricity. Your gas or electric company can tell you what it will cost to operate the dryer for an hour.

The Cost of Heat for Ironing

Practically all irons manufactured today have 1000-watt heating units. The current is cut off about half of the time except when ironing very damp or heavy materials. For those who do not pay more than three cents a kilowatt hour for electric power, it cannot cost more than a cent or two to iron for one hour.

Costs of Laundry Supplies

The cost of cups and tablespoons of the laundry supplies quoted in this bulletin are based on the amounts that will be used in agitator machines. These machines hold 16 to 18 gallons of water. Tumbler-type automatic machines use less water, often only half as much, because the tumbling action does not involve the movement of clothes in water. The amount of any supply needed depends on the amount of the water in the machine.

Products that are considered interchangeable are usually sold in about the same amounts and at prices that do not vary more than a few cents. For example, for several years packages of most of the laundry soaps and synthetic detergents have sold for from 25 to 30 cents and have contained about eight cups. New products, such as detergents with controlled sudsing and the non-precipitating water softeners, will be sold at higher prices until a large market is developed.

The following prices and costs are suggested as guides. The actual cost to any one family is the price paid for a package divided by the number of weeks it lasts or the number of loads washed.

Costs of Laundry Supplies

	Detergents including soap*	Non-precipitating water softener	Precipitating water softener	Chlorine bleach
Amount in package	8 cups	3½ cups	8 cups	4 cups
Approximate price of package	25 to 30¢	42¢	24¢	12 to 20¢
Amount suggested on label for one load	About one cup	½ cup	2-3 tablespoons	1 cup
Cost of amount suggested	3 to 4¢	6¢	1/5 to 2/5¢	3 to 5¢

*Soap, of course, is a detergent but the term is often used only for the synthetic ones.

Although the precipitating water softeners are much less expensive than the non-precipitating ones, the expensive ones are often chosen because they have other qualities that improve the laundry, such as the removal of soap curd.

One cup of non-sudsing detergent, priced at 45 cents for 24 ounces, costs 15 cents—the amount recommended for an agitator washer full of water. Experience shows that a little less detergent often can be used. When this type of detergent is used in tumbler machines, the amount needed is still less, and will solve problems that exist when sudsing detergents are used. Furthermore, softener does not need to be used with it.

The costs for water and supplies for the same washing will vary with the number of loads run through the water. The costs for water and washing supplies for a non-automatic washer followed by two 16-gallon rinses will be about the same as for running two loads through an automatic washer. If only one load is run through the automatic washer the cost will be half as much and if several loads are washed the cost will be higher. Several loads of slightly soiled clothes can be run through the same water in the non-automatic washer. The homemaker learns from experience when water should be replaced. Those who use automatic machines feel that the added cost of changing water is worth while because work is easier and less time is used.

The following table shows how costs for water, soap, and softener for the same amount of washing can vary. Mrs. Allen washed six loads of slightly soiled clothing in a non-automatic machine and gave them two 16-gallon rinses. Mrs. Brown washed in the same way but changed wash and rinse water once. Mrs. Clark washed six loads in her automatic machine. Each cycle used 20 gallons of hot water and 20 gallons of cold water.

Different Costs of Water, Soap, and Softeners Due to Number of Water Changes
(Six 8-pound loads)

	Mrs. Allen No change of water	**Mrs. Brown** One change of water	**Mrs. Clark** Six changes of water
Amounts used			
Water, gallons			
heated	24	48	120
not heated	24	48	120
total	48	96	240
Soap, cups	2¼	3	6
Softener, cups	½	1	3
Cost			
Water, 1¢ for 30 gallons	1½¢	3¢	8¢
Heating water, 1¢ for 4 gallons	6¢	12¢	30¢
Soap, 4¢ for 1 cup	9¢	12¢	24¢
Softener, 10¢ for 1 cup	5¢	10¢	30¢
Total cost for 6 loads	21½¢	37¢	92¢

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